8-14-2019

Is Success in IT Projects a Fata Morgana? - A Case Study of a Large Healthcare IT Project

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IS SUCCESS IN IT PROJECTS A FATA MORGANA? - A CASE STUDY OF A LARGE HEALTHCARE IT PROJECT

Research paper

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Abstract

A Fata Morgana is a far-sight vision that disappears when you get closer. In a case study of a large healthcare system we find the notion of success to have the same characteristics as a fata morgana. We present the case and give an account of how it can be considered a project success. We then bring in the public opinion as seen through newspaper stories about the same case – and the success disappears again. This is important because we can use this dichotomy to identify coping strategies one can use as project owner and/or project manager to define and ensure that the project will be perceived as a success. We conclude the paper by summing up the coping strategies identified in a resulting framework.

Keywords: Project success, IT healthcare, Case Study.

1 Introduction

IS project success is an ever confusing term as multiple different interpretations of the concept of 'success' stretches in different directions (Lientz & Rea, 2007). Nevertheless, the vagueness of the term is matched by its perceived importance in academia and in practice; whether a project has been a success or a failure is in the eye of the beholder. Back in the 90's Shenhar and Dvir (1996) and Chris Sauer (1993) suggested that the conceptualization of 'success' and 'failure' is still in its infancy while others state that 'project success' is an illusory construct (Pinto & Slevin, 1988). Several scholars have pointed out that it is of crucial importance to effective project implementation to know just which criteria to evaluate against (DeLone & McLean, 1992, 2003; Pinto & Slevin, 1988) and it is crucial for the research on the subject as it defines what is to be studied (Sauer, 1993). However, having studied the literature on success (1996) bluntly states that only a few people have hitherto thought seriously about success. Despite the widely cited Information System (IS) success model (Delone & McLean, 2003) conceptualises IT project success and its antecedents by claiming that net benefits of an IS is determined by the usage and user satisfaction and correlated by information quality, systems quality and service quality. Interesting enough, the delimiter between the process of the IS project and the final IS product has not been researched very strongly. This delineation leaves the project managers and project owners of IT projects in a tough spot as both will benefit from successful projects, but the perception of success is so elusively based on a presumed combination of perception of process and product that it can be difficult to grasp which is which. The project success phenomenon can be viewed as a 'Fata Morgana'; "a synonym of "mirage" (Dictionary, 2006; Hornby & Cowie, 1995) that is a deceptive image of a distant object, an illusion or fantasy; something that appears real or possible but is not in fact so.

The topic of this paper is to describe IT project success as that of a fata morgana by the use of technological frames (Orlikowski & Gash, 1994) as an analytical lens by asking the research question: "*how to grasp and embed the outlines of success in large IT projects*?"

We draw on a case study of Denmark's largest Healthcare IT project to this date: The HealthCare Platform (HCP). The authors followed the project for nearly 3 years and the project ended in 2018 when all hospitals in two healthcare regions of Denmark implemented, maintained and updated the system regularly. The study draws on the technological frames framework (TFR) by (Orlikowski & Gash, 1994) to interpret the mental models of central project participants who engaged in the process.

The HCP project actually achieved its goals on budget and on time and could be considered a rare large, public IT project success. However, the project was seen as a huge failure by many – and has been reported as such in most Danish newspapers.

In the following section we will first review the literature on success. Then we give an account of our research method for the case study and how we have coded our data. We then report the case study findings in two sections; one on the success case and one on the failure case. Next, we turn to identifying coping strategies one can use as project owner and/or project manager to define and ensure success. This leads to a simple framework presented in our discussion and conclusion.

2 Success – in theory

The definition of 'project success' has by many authors followed the tradition of pinning up three main measurement assessments popularly known as 'The Iron Triangle' (Atkinson, 1999). This triangle includes 'Cost' –measured in terms of meeting the budget, 'Time' – measured in terms of meeting the schedule, and 'Quality and Scope' –measured in terms of conformance to functional and technical specifications, defects and reliability at the commencement of the execution phase (Freeman & Beale, 1992).

According to a survey by Ernest and Young (Garrity & Sanders, 1998) the top two ranking measures of CIO's and their CEO bosses was, 1) on time, and 2) on budget. Similarly Wateridge (J. Wateridge, 1998) found that project managers tend to focus on cost and time as these are the criteria they are appraised by, by their superiors, the CIO and CEO. More recently Serrador & Turner (2015) showed that project efficiency – defined as meeting schedule goal and meeting budget goal - correlates "moderately strongly" to overall project success.

While being widespread used as a success determinant, the 'Iron Triangle' is too simplistic and project objectives are more complicated as they will inevitably vary based on just project type (De Wit, 1988). Atkinson (1999) nails the coffin shut with the title of his article "Project management: Cost, time, and quality, two best guesses and a phenomenon". Rather, it has been argued that one must inevitably also focus on the success of the product result of the project and how it is used and handled (Delone & McLean, 2003). For example, product success is the "anticipated benefits" (Cooke-Davies, 2002) which may not be realised in the project but instead is left to be managed by operations after the project has been delivered. Focus becomes a matter of stakeholder perception (Gomes & Romão, 2016) and soft factors such as knowledge acquisition, end users and steering group satisfaction, lessons learned, and personal rewards, along with hard factors such as cost effectiveness of work, meeting planned quality standards, and activities carried out as scheduled (Joslin & Müller, 2016) also plays in when assessing project success.

However, Baccarini (1999) argues that process and product success are two separate and different concepts. It is a misconception to speak of 'the perception of success' changing over time from being focused on cost and time to being focused on customer satisfaction because these are two entirely different variables. Fuddling the two variables has the unfortunate effect of failing to recognize that both success and failure can co-exist at the same time. A project may, in fact, be perceived as successful in accomplishing the project *process* but not in its *product* meeting customer satisfaction. A well-known example of the two being different is the Sydney Opera House. If that is evaluated on the grounds of the project process it was a sheer disaster. It took 15 years to complete (10 years more than initially

estimated) and 15 times the original budget (Hall, 1982). However, the product success in the long term provided great acoustic value and with a marvellous architecture and cultural symbol of Sydney and Australia as a whole.

Hence, the passing of time is a core distinction between project process and product success (De Wit, 1988). Project-process success objectives such as cost, time and quality, are short-term and can be evaluated on completion of the project. Product success, on the other hand, is not always evident until a distinct period after the utilization (Munns & Bjeirmi, 1996) and any user satisfaction evaluations made immediately after implementation can change dramatically (Shrnhur, Levy, & Dvir, 1997).

We argue that the distinction of *project-process* success and *product* success is very important when assessing successes of large, public IT projects. As any criticism expressed and directed at decision makers can inherently be viewed as potential for formalised learning the criticism needs to be handled appropriately on its own terms, not by mistakenly fuddling the concepts together.

3 Technological Frames

In order to view the individual perceptions and sensemaking arguments of how stakeholders handle criticism and often will fail to properly defend themselves, we draw on the framework of technological frames. TFR is especially useful to understand the perception of technology products and processes from an individual social cognitive point of view as it explains why and how individuals have various perceptions of success in a technology project. TFR was pioneered by (Orlikowski & Gash, 1994) and has since been applied to many different areas, e.g. using technology features as the triggers for identifying the mental frames of involved stakeholders in IT development projects (Griffith, 1999), or through a longitudinal tracing of the perception of requirements determination (E. J. Davidson, 2002). Later reviews have found that TF has been used to explain multiple various phenomena of organisational changes, by drawing on the concept of frame congruence, political process, and even in various types of technology sensemaking, application, and use (E. Davidson, 2006). Technological frames take as an underlying assumption that cognitive mental models of individuals consist of three main concepts: assumptions, knowledge and expectations. All three influence the way individuals see the world "By shaping individuals' interpretations of organizational phenomena, frames implicitly guide them to make sense of and take action in organizations" (Orlikowski & Gash, 1994, p. 176). Assessing the technological frames of a target audience in an organisational change process is useful as a means to get understand the reasons behind decisions, experiences based on each individual reactions and action-taking. For example, if a participant has the assumptions that all users are aware of how to individually configure their own user interface, and the knowledge that this is entirely possible, this will have an impact on said participant's expectations of how well the piece of software will be received. Expectations not realized can clash with the individual's existing assumptions and knowledge, and the new experiences can either be rejected or accepted as new knowledge.

In the context of this study, the frames are technological by the nature of the project being an IT implementation process being handled. We will focus on evaluating the congruence of the frames and the three concepts of frames as these can be used to interpret and explain the positions and experience of the actors involved.

4 Research Method

The empirical data of the project consisted of three workshops that initiated the interest in the project and continuously refined the research focus. Upon identifying a research focus, four semi-structured and in-depth interviews were held with central participants involved in the HCP project (see Table 1 for an overview of the empirical material). The interview guide was based on findings from the workshops. Participants were pseudonymized (Bala, Charlie, Dakota, and Everett) and reviewed the interview transcripts and ok'ed the quotes used. After coding and analysing the interviews, several newspaper clippings were identified and used as a backdrop and example of the strong media discourse on the overall project. More than 800 media articles have been written about the HCP project and as such

the newspaper clippings reflect only a fraction of the general discourse. The clippings were selected based on their severity and focus on both issues pertaining to both process and project success.

Data type	Workshop A	Workshop B	Workshop C	4 Semi-structured interviews
Date		November 2017	May 2018	October 2019
Length (minutes)	360	240	120	60-180
Participants	25	20	35	4
Participant backgrounds	Change agents, project participants, doctors, nurses, politicians, and (potential) patients	Project Managers, Change agents, and University Professors	Experienced project managers	CIO of top management ("Everett"), 2 x project coordinators ("Bala" and "Dakota"), 1 administrator ("Charlie)
Empirical processing	Thick descriptions and notes	Analysis of workshop findings	Analysis of workshop findings, presentation material analysis	Recording, coding and narrative building based on TFR
Research outcomes	Qualitative narratives from distinct stakeholders	19 suggestions for coping strategies	9 lessons learnt	Individual qualitative aspects and perspectives on project-process and product success

Table 1. Overview of empirical material for the study. Newspaper clippings not included.

All data was coded in NVivo and followed coding procedures inspired by grounded theory coding (Strauss & Corbin, 1997) – that is open, axial and selective coding. Firstly, each author openly coded all the interview data. Codes were consolidated and axial coding revealed nine core themes with varying dimensions such as 'retention after go-live', 'the 5 waves', 'communication', 'management support', 'scope', 'the culture', 'demands', 'pilot', and 'risks'. The selective coding changed into the two main aspects of project assessment; the project process and the project product, and by drawing on the TFR framework as analytical 'micro lens' several minor 'stories' emerged revolving around the two core aspects.

5 The Healthcare Platform Case

At the time of writing, Denmark is divided into five regions and 98 municipalities. The governing bodies of the regions are the regional councils which are responsible for all treatments provided by the Danish healthcare system. In 2010 the five regions established a regional healthcare IT organisation and decided on letting the regions consolidate all Electronic Patient Records (EPR). In two of the regions – The Capital Region around the city of Copenhagen and Region Zealand this led to a decision in 2013 to invest in a new Healthcare system – and a standard system from USA named Epic was chosen; by far the largest investment in IT in a Danish health care context. The Capital Region invested 2.1 billion and Region Zealand invested 700,000 million DKK (a total of 430 million US Dollars) and in total estimated to replace some 30-40 different old IT systems, change the work practices of 44,000 employees and affecting 2.5 million citizens. The overall purpose was three-fold (Rigsrevisionen, 2018):

1. Merging approximately 30 IT-systems into one.

2. Increase the quality of patient treatments i.e. by ensuring that the IT-system always follows recommended treatments from the National Health Board ("Sundhedsstyrelsen").
3. Make work procedures at hospitals more efficient, e.g. by letting doctors carry out data registration directly in the system instead of hospital secretaries doing it.

Financing was done on an inter-regional, departmental and individual hospital level. The two regions had the same program organization, HPO (the Healthcare Platform Office), but different business cases were developed by the local project teams (Rigsrevisionen, 2018). The overall project was organized in two main programs (each program containing multiple projects); 'Finance' and 'PMO' which was split into various thematic projects such as 'Readiness & Change', 'Communication' 'Education & Implementation', and 'IT & Tech' with each their sub-project manager. For each clinical specialty, one implementation coordinator acted as a bridge between all sub-project managers. The implementation coordinators also communicated with all the heads of departments, shared experiences with other implementation coordinators and sub-project managers by coordinating (bi)weekly meetings with all relevant stakeholders.

The HCP was a 'phased implementation' with five phases called 'waves'. The first wave implemented the HCP system in two hospitals in the Capital Region with a focus on a functional system and only limited reconfiguration and only critical error correction. The second wave implemented the HCP in the largest hospital ('Rigshospitalet') and built on the experiences from the first wave; a few issues with databases but otherwise no severe changes. The third wave implemented HCP at the final three hospitals in the Capital Region. Wave four implemented HCP at all psychiatric hospitals, and by the fifth wave –scaling the implementation of HCP to the whole of Region Zealand– the HPO had improved their procedures to thoroughly explain the sub-project managers and implementation coordinators how the processes should be run. As the implementation progressed more modules such as 'clinical advice' were finished and more focus was given on changing and adapting the implementation process, handling finances, assuring quality and aligning with the IT strategy (the latter being very important in the final wave). Each deployment was called a 'go-live' and three weeks of 'hyper care' (extensive focus and resources utilized to solve unintended consequences) followed.

6 Success stories in the case

From a project-process view the HCP project was a success. The project was granted the resources needed, and with meticulous management it launched on time. Tight communication ensured cross regional and programme alignment. The project managers established a human network to counter and manage unforeseen incidences and bridging potential knowledge gabs between the project teams and operation management. Measures were taken to involve the clinical staff early on in the process and to have clinical guidance throughout the customisation of Epic. Technically the system as such was also a success of high quality and functionality, though the project did encounter technical issues primarily due to poor technical integration options with other old systems, poor data quality of old databases, or integrations with systems which was not part of the original scope of the project.

The framing by project owners and project managers also supported a success in terms of its application in the organisation; the functionality and capabilities of HCP, the strategy for acquiring HCP; its role in and value for the organisation, as well as the use of HCP in the organisational context. The success stories all point to elements of the HCP project process that can aid in avoiding the perception of a fata morgana and support potential diffusion of failure issues brought upon the project by media discourse and angry users.

The National Audit Office of Denmark granted that the HCP project succeeded on time and within budget. Not only was the project delivered on time and budget, but the HCP runs 24/7 at about 100 pct. availability with close to perfect response time for some 50,000 users. Looking at performance tests and up-times of the system, the project had no major surprises and the project was: *"[…]run in a straight line within time and budget etc. and performance and uptime and everything else. You will not find any other project which has run as straight as this."* – Everett.

The statement above showed a sense of pride for the project and may through this have framed the expectations of the project, paving the way for potential expectations of how the project and its product *should* have been received by the end-users. The strategies taken to ensure the progress of the project process illustrate an interpretation of project that would elevate and secure the regions into a new era of digitalised hospitals and healthcare services.

Another success story of the HCP project was how well the phased implementation worked both in terms of sticking to the original project plan from EPIC which the HPO executed but also in anticipating challenges and changes in work practices that had risen amongst the users. One example of learning was to configure work process changes across departments to avoid local changes: *"[…] they discuss the consequences for practice with the physicians so […] the physicians can prepare themselves. […] We chose to change that concept at the psychiatric department because we work with lean and improvement culture, […] we wanted the same practices across departments."* – Bala.

In the above, Bala was of the mental frame that she knew that it was important to inform the end users of the changed work practices introduced by the HCP. The identification of this learning was based on how local configurations had been enabled between the hospitals in waves 1 through 3. As a result, she identified that the local culture of improvement enabled a more global change to work practices in the psychiatric setting through the underlying assumption (and experience) that local work changes were not desirable.

The final success aspect of the HCP was the successful allocation of resources allocated to the project. Bala successfully introduced a top management focus on pausing other projects to better enable the proper amount of resources to the end-users so they could themselves focus on the work process changes and local improvements. The fifth wave was also an example of resources allocation, as the implementation coordinator from Region Zealand was appointed a single point of contact from the central HPO. The project team from Region Zealand differed from the previous Capital Region structure in that Zealand had a dedicated programme structure and a close collaboration between the project team which actually enabled easier top-level management support to back up the execution of work: "*And that is the good story because I got the recourses that I wanted."* – Dakota.

7 The Fata Morgana Failure Phenomenon in the Case

As we move closer in on the Healthcare Platform project, we do start to see the initial cracks: signs of failure both from a project process, functional and implementation point of view. These cracks may very well be signs of incongruence among the technological frames held by different stakeholders. The signs of failures seeped out into the public domain through retired users or simply adamantly resistant users holding different technological frames with regard to their assumptions and expectation to the HCP. The interpretations of the expected usage of HCP were probably partially based on the assumption that HCP would provide a high level of efficient and supportive work practice environment. However, experience did not match the expectations and the incongruence of frames found its way into the general media. The failure stories had a profound impact on the public opinion towards success of the HCP project. We do not draw out the media stories to show what is true or not, but rather to show where the risks of the large project actually lay. These risks were exemplary aspects of potential misalignments between technological frames. We identify the following potential for incursion of failure issues that attempted to blur or erase the successful aspects of the project in tables Table 2, Table 3 and Table 4.

	Clipping example	**Take-aways**
1a. Potential problematic issues in procurement process	"*unwarranted competitive advantage*" due to a "*close, personal relation*" (Politiken, 2/18/2018, p. 7); "*buying a new car, […] where we could only try the horn and the clutch without*	Lack of transparency of the process undermined the merits by changing assumptions of the users and support any future failure expectations experienced.

	actually going out for a ride." (Politiken: 2/18/2018, p. 7)	
1b. Unexpected costs due to functional and use-related errors	*"… an error in the Healthcare Platform the patient treatments at the hospitals have not been properly registered into National Patient Registry*" (FrBorg-Amtsavis: 9/25/2018).	Lack of initial focus on analysis and quality on data rendered the project costlier and more cumbersome by bedding and aiding to the diverse interpretations of both the nature of and strategy for HCP.

Table 2. Showing project process issues as incursion of failure #1

	Clipping example	Take-aways
2a. Modules not working or still left without integration	*"…the personnel need to […] go through 15,000 receipts and medicine prescriptions that may be erroneous."* ("Mja.dk": Midtjyllands Avis:2/10/19).	Lack of functional know-how instigated worry for potential patients in their expectations of the SCP.
2b. Older patient records difficult to access	*"… we now have to log in with our digital record signature into the patient record. After many clicks we can then finally see the blood samples of the patient."* (FrBorgAmtsavis: 9/25/2018)	Lack of design competences of the project team influenced the assumptions of general incompetence through the knowledge of the end-users performing cumbersome work processes.

Table 3. Showing project product issues as incursion of failure #2

	Clipping example	Take-aways
3a. A costly need for additional technical configuration after go-live	*"… they continue with expensive stopgaps that will not help us."* (FrBorg-Amtsavis: 9/25/2018)	The lack of configuration during the 5-wave implementation brings the assumptions that it was not possible to properly configure the system
3b. Lack of knowledge of how to use the system properly in order to make personal configurations	*"The only thing we demand is an IT system that works well and that helps us in our work day"* (FrBorgAmtsavis: 1/28/2017)	The non-benefits from end-users' new work processes influence the expectations that another, better IT system could be a viable solution

Table 4. Showing implementation issues as incursion of failure #3

8 Avoiding the Fata Morgana – Coping Strategies

The failure aspects of procurement process, functionality and implementation issues all pertain to an interesting discussion: how to cope with such strong-worded opposition from the press and internally in the organisation to ensure that the project perception does not slip into a state of fata morgana where project success seems real but vanishes upon closer inspection? In the following we go through 6 coping strategies that we identify in terms of their usefulness to the specific project as they were used, how they could further be taken advantage of as well as the failure risks that might incur. Table 5 shows our framework that proposes coping strategies for defusing fata morgana failure issues and also risks fata morgana failure incursions.

ID	Coping Strategy	Potential diffusion of failure issue	Potential risk of failure incursion
I	Rigorous top and program management	1a	2a
II	Early experience-gathering and infusion	3b	3a
III	Project organisation retention after go-live	2a, 2b	3a, 3b
IV	Continuous resistance handling	1b, 2b, 3b	~
V	Technical and organisational inter-regional adaptation	1a, 2a	1b, 3a and 3b
VI	Reinforced user configuration and assistance after go-live	1b, 2b, 3a	1b, 3b

Table 5. Overview of coping strategies and how they relate to failures and failure risk incursion

8.1 Rigorous and transparent top and program management

Top management knew that the scope of the project required a very rigorous top and program management as not only would the technical aspects change, the organizations would also be merged. Program management was needed because everything had to be streamlined into as few variants of variables as possible. This was primarily focused on the hardware aspects of the implementation: *"We are building this solution collectively but we need all kinds of different setups in the Regions to work because we have different third-party systems, physical work stations. So we had to have multiple delivery programs at the same with different steering committees. […] And it is really complex […] because we needed a common infrastructure […] and we became sub-contractor for delivering two mirrored data centers with fiber and operational procedures"* – Everett.

Everett strongly expressed knowledge about the nature of HCP and how to integrate HCP into the organisation in terms of the specific project process conditions. The point here being that the project was very complex from a technical point of view.

The complexity was also experienced during the fifth wave as the Region of Zealand would have to merge many assets and structures with the Capital Region: *"…we described this program structure for Region Zealand and our whole IT department had to directly communicate with the IT department from the Capital Region. […] It impacted our organization big time and at that time we had no idea how huge this would become."* (Dakota). In quote, the emphasis is very much on the importance of the description of the program structure which was valued very highly, as the transparency of roles and responsibilities helped the internal coordination along.

The positioning of key persons tasked with spanning the structures and specifically work across the line management in order to share knowledge and information was a huge success. Despite the size (and complexity) the project did not feel very large for the sub-project managers and implementation coordinators.

As a coping strategy the transparent program management for both regions was both needed and very helpful for the previously described success stories. We further see other aspects where the coping strategy could have had the potential to either mitigate, or at the very least, be used to somewhat diffuse the failure aspects. What this means is that the program management seemed to work as a leveller for aligning different technological frames. Hence, we argue that this coping strategy was useful but could have been useful to also have included prior to the procurement process and used as an argument against Project Process Issues 1a based on the rigor of said process. Very little can be done

against accusations of corruption other than having a transparent process and structure. It is also important to note, however, that rigor in structure has the risk of creating blinders to issues early in the process and could likely be explained by the failure issues such as 2a as well.

8.2 Phased implementation in waves enabled early learning

The phased implementation approach required the configuration of the HCP to be kept to an absolute minimum because for each wave, the implementation would be scaled up to a larger, or more complex, target audience. However, the low amount of technical configuration changes ensured that it was possible for the target audiences for the coming waves to learn from the previous implementation and infuse the learning points into action steps for the coming waves: *"Some areas needed changed work procedures. [Another person responsible for an earlier part of implementation] had a very theoretical approach and we sucked up all of that learning and experience like a sponge. They had implemented a stepwise approach which enabled us to start immediately with informing the stakeholders."* – Dakota.

Dakota's assumptions and knowledge about usages of HCP comes partially from the experiences of a fellow implementation coordinator tasked with the same job another place in one of the organisations. These assumptions fed into Dakota's expectations of the usage of HCP would and should take place in own part of the organisation. Another impact of the waves was that the approaching wave ensured time for each organization to start up and form by building on earlier experiences:

"When I started we had no organisation, no obligations besides attending the inter-Regional meetings where I received a lot of information. […] Someone needed to know. So, I initiated my chief executive officer, our chief data planning officer and our chief of quality." – Dakota.

Dakota deliberately diffused knowledge about the nature and strategy for HCP amongst executive colleagues and thereby helped supporting congruence and alignment of their mental frames.

The technically locked phased implementation was a double-edged sword really. The lack of error fixing or process remodelling in the early waves of the implementation resulted in more user resistance, while the later waves would have trouble receiving additional resources if needed: "*Freaking frustrating. So much information we could not get because [program management] were focused elsewhere. The other [waves] had received six [and four] months but we only had two months to do everything.*" (Bala). Bala's frustrations could be understood as incongruence of frames in regard to her expectations of the HCP implementation strategy. Based on the strategy she assumed that knowledge from the first of waves would be transcended into the following waves and thereby also expecting them to utilise less strategic efforts while being given more time to complete. However, the hyper care concept meant that the HPO had very little additional resources and time to inform each consecutive wave.

The coping strategy for the project had many opportunities for handling failure issues, specifically 3b as the early learning would benefit the coming waves, making it easier for the implementation coordinators and project managers to identify actions and interventions to make it easier to cope with the implementation. Thereby on the one hand, the phased implementation approach as a HCP strategy worked in favour of aligning the TFs especially at the executive level. However, the lack of technical configuration would also increase the risk of incurring failures in terms of issue 3a as this would be made very late in the process. On the other hand, the phases could induce incongruence in the TFs specifically with regards to the nature of HCP in terms of application in context.

8.3 Project organisation retention after go-live

The rigorous program management created positive benefits in that knowledge was shared much faster in the new departments created to take over operations. One respondent noted that the program organisation resulted in: "*All the hospitals delivered resources and after the program was delivered to central IT all those employees are back here, so I have a colleague from finances who just knows everything. And we have collective regional workshops for managing all data queries."* (Charlie). In this way, the organisation of human resources helped align the mental frames among the employees. The returning employees held valuable knowledge about the HCP which also helped spread knowledge of

the HCP and in turn more congruently shape their frames in terms of assumptions and expectations for what was to come and how to handle issues: "*Our [technical builders from Region Zealand] are all involved in the Capital Region. And now they have asked the leading domain specialists with a large mandate how to configure the system.*" – Dakota.

The coping strategy had potential to defuse failure issues 3a and 3b and ensure congruence of technological frames amongst the stakeholders as the experiences with the system now had grown so large that final decisions could be made and knowledge could be diffused into the new organisation structure.

8.4 Continuous resistance handling

As the waves were implemented in the process it became more and more obvious that user resistance needed to be handled after each implementation wave and continuous throughout the project. The coping strategy was for new waves to invite all users to kick-off meetings and address all hearsay about the system either by addressing solutions or by simply being honest about the implications and noting that they did not know yet:

"So at the kick-off [my chief executive officer] noted how all of the problems were taken care of. [..] we […] had a large parking spot with questions we did not know how to answer. Vacation? Extra hours? We did not know yet. [we told them] "It is gonna be hectic and a different kind of year […] and we will all be novices because we do not know the system either." – Dakota. The honesty provided to the users here was central. Dakota did not know what would come and those expectations, or lack thereof, also impacted the users' own expectations. Rather than selling an unknown product through positive expectations, she would simply influence their knowledge of what would come.

Some issues also created a big hunchback of work that needed to be taken care of:" The *Healthcare Platform has had quite the turbulent process where [the users] did not document correctly and now we have to clean that because we have stacks of records that need to be changed."* – Charlie. What Charlie reports seems like a reaction in terms of conditions in context to the end users' knowledge and actions of the nature and applications of HCP

Continuous resistance handling and cleaning up the initial mess was a coping strategy with the potential to handle 1b, 2b as well as 3b and actions based upon the interpretations of the role and application of HCP.

8.5 Technical and organisational inter-regional adaptation

To ensure that the system supported the new organization it was essential to make sure that all changes made to the technical configuration were rooted in top management decisions and agreement across both Regions. One of the major issues would have been if a single hospital made significant changes to the technical configuration: *"We have fought against that. The basic elements of [the system] are what they are and we can make builds for each clinical speciality but it is common for all. This makes it difficult to make [hospital-specific] changes because other hospitals will not see it."* – Bala.

The coping strategy was a continuation of the rigorous top management but it was not directly outspoken. However, it was a managerial interpretation of the specific conditions and applications of HCP. Such a coping strategy, if correctly operationalized, could have the potential to alleviate failure issues 1b, 2b, 3a and 3b. However, due to slow turn-around of issues that would need to be discussed and decided on across the organisations it might also impact 1b and 3b since the changes to the technical configurations would require re-implementation every time.

8.6 Reinforced user configuration and assistance after go-live

The vast layers of possible changes to the configuration of the system created a need to start a user adaptation as soon as the users felt ready for this. This would also follow logically from the coping strategy of resistance handling. However, the readiness for changes depend on the users' technical

frames; their assumptions, expectations and knowledge which needed to be carefully assessed from department to department and from user to user: *"If you forget to use the agreed-upon abbreviations consequently then you may end up with 20 different department denotations: "lung med", "lung medicine" with difference between patients as well. […] Some believe that the implementation is done while other [users] are eager to move on and reconfigure the system. In my hospital we are beginning to make individual changes to the graphical user interface for the physicians so buttons can be swapped. "* – Charlie.

The Healthcare Platform was selected due to the ease of technical configuration, though the largest barrier seemed to be organizational rather than technical in terms of aligning the different stakeholder TFs: *"… it was really simple to just change the steps in the process. We have had a lot of configurations but no actual problematic builds. We are now assessing all the specialties and it has become apparent that the clinicians do not know that they have already had tailor-made builds for them in question"* – Bala.

The coping strategy held a lot of potential, since it contained many activities that were not communicated directly to the end-users. Taking advantage of the coping strategy even more could potentially alleviate 1b, 2b, and 3a. However, the risk of coping even more with the technical configuration might also be to negatively influence 1b and 3b.

9 Discussion and Conclusion

It is hard, maybe even impossible, to say whether the HCP project was a success or a failure. Projectwise it can be seen as a success using the "Iron Triangle" definition. However, beyond defining goals for cost, time and quality we argue that defining uncertainty related to the activities were equally important and that having an organisation that could cope with uncertainties helped the project process especially seen in relation to the internal implementation. The *Fata Morgana* phenomenon – as we have called it – was seen in the media discourse impacting the incongruence of technological frames held by the general population (which could be considered potential users) as well as internally in the user groups at hospitals. In a project of this magnitude different perceptions can lead to different interpretations of the technology in terms of its nature and role in the organisation and in relation to its application in the organisation. This incongruence was what we saw as the deceptiveness that spawned an illusion; something that appeared real but was in fact not so – a *Fata Morgana*.

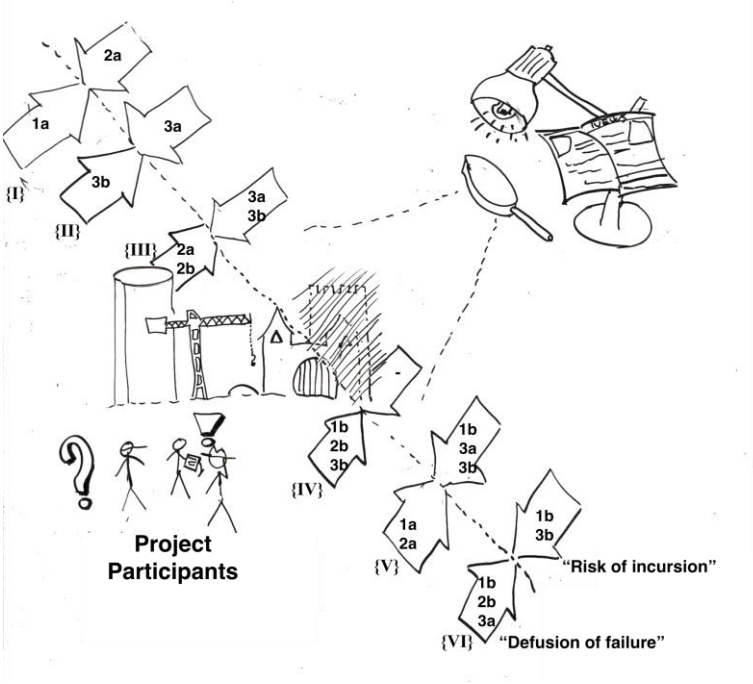

Figure 1. Rich picture of the coping strategies identified (in Roman numerals), their potential for defusing failure (arrows upwards) and the risks of incurring said failures (downward arrows). The potentials and risks are taken from the previous Table 5.

To avoid being deceived by a Fata Morgana, our first coping strategies come into play: Have rigorous top and program management throughout the project. Take advantage of the learning (e.g. through phased implementation) so that experiences gathered are infused back to the organisation.

If we are to look at the HCP project product-wise according to the DeLone & McLean model (2003) then the three quality measures influenced the product perception. Especially both information and system quality can be said to score low according to the failure stories as for instance the understandability and completeness (information quality) seemed lacking as did also the usability and reliability (system quality) of the system. These quality measures influenced both user (dis)satisfaction forming knowledge of HCP and intentions to use; assumptions and expectations – the users' technological frames.

Again, some coping strategies come into play; One should manage resistance to change up-front; this is a matter of following-up on the expectations gathered early and making sure that technical and organisational adaptation are possible across the whole set of target groups. Finally, the coping strategy of user retention by relocating central users back into the organisation could also be said to attain to the system quality.

To conclude our contribution in this paper is a coping strategy framework for large IT projects to avoid the Fata Morgana (failure) phenomenon, which the HCP case in some cases utilized but could have exploited even more. Our framework is mainly empirically based on data from managerial level leaving it one dimensional; it is aimed at (project) managers. Hence, a next step to make our coping strategy framework multi-dimensional would be to give the end-users a stronger and more diverse voice in the matter. To see how the end-users' technological frames aligned across professions and hospitals and if they were and maybe still are all so aligned with the public portrait according to the news stories.

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